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## **BACTERIOLOGY FOR NURSES\***

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Modern Bacteriology was placed upon a definite scientific basis by the researches of Koch into the disease-producing bacteria. He introduced the materials called media, on which we now grow bacteria in the laboratory, and demonstrated how a disease could be reproduced in an animal by introducing the bacteria into its tissues, which procedure is known as inoculation. He formulated certain conditions which an organism must fulfil before it can be said to be the cause of a disease. These conditions or postulates are:

1. The organism must be constantly associated with the disease.
2. It must be separated from all other bacteria or, as it is called technically, isolated in pure culture.
3. It must reproduce the same disease, when it is introduced into the tissues of animals and the same organism must be found in the animal tissues.

He succeeded in discovering a number of bacteria which fulfilled these postulates, among which were the following: The Typhoid bacillus, which causes typhoid fever, he found in 1880 (this was also found independently about the same time by a bacteriologist named Elberth); in 1882, the Tubercle bacillus, the cause of all cases of tuberculosis or consumption; in 1884, the Cholera bacillus. In 1890 he made Tuberculin, a syrupy substance which, it was thought at first, would be a cure for consumption, but later was found to be of no value in this way, and is only used now as a test of the presence or absence of tuberculosis. Within the last few months we have been hearing about his investigations into the relationship of tuberculosis in cows and that in the human being.

Other bacteria, their discoverers and the date when found, are:

The Klebs-Loeffleur bacillus, by Klebs and Loeffleur, in 1884. It causes diphtheria.

Diplococcus pneumoniae by Fraenkel in 1885. It produces pneumonia.

Bacillus influenzae by Pfeiffer in 1892. Influenza or "La grippe" is caused by it.

Bacillus of bubonic plague by Kitasato, a Japanese, in 1894.

Bacillus icteroides, by Sanarelli, in 1896, is the cause of yellow fever.

\*One of four lectures delivered to the Nurses of the Toronto General Hospital and the Hospital for Sick Children, Toronto, November, 1905.

Although all of the above and many other organisms have been isolated, bacteriologists have yet to discover the germs which cause some of our commonest diseases, such as smallpox, measles, scarlet fever, and whooping-cough. These unknown bacteria may be so small that our present microscopes do not magnify them to a size large enough for us to see them, or they may require some special form of preparation which has not yet been discovered. We cannot but be sanguine, however, when we consider the rapid development and wonderful advances which bacteriology has made in the last twenty-five years in comparison with the slow progress of the two centuries immediately preceding that time.

What are bacteria? They are very minute plants of a single cell which contain no chlorophyll, the substance that gives the green color to leaves and stems. Each plant or cell is composed of a wall surrounding a mass of albumen or protoplasm, which resembles closely the white of an egg. These cells increase in number by fission,—that is, by each cell dividing itself into two cells, each of which again divides into two, and this multiplication continues as long as favorable conditions for growth are present. *So we may define bacteria as microscopic unicellular vegetable organisms, devoid of chlorophyll, that multiply by the process of transverse division.*

*Classifications.*—For many years no classification could be found that would satisfy the minds of more than one or two schools of investigators. By degrees this state of confusion has been reduced to one of comparative order, which is used by most of the authorities on the subject at the present day.

The classifications are made as follows:

1. According to the class of fungi or mycetes to which bacteria belong.
2. According to the materials which they live on.
3. According to their shape or morphology.

(1) According to the class of fungi or mycetes to which they belong:

1. *Blastomycetes, or yeast fungi.* An example of this form is seen in the white growth known as thrush, which grows in the mouths of babies.
2. *Hypnomycetes or mould fungi.* To this class belongs the organism which produces ring-worm.
3. *Schizomycetes or fission fungi.* It is to this class that we will devote most of our attention during this course.

(To be continued.)